

REMARKS

Claims 16-45 remain pending in the present application. Claims 16-19 have been amended. Basis for the amendments can be found throughout the specification, claims and drawings as originally filed.

REJECTION UNDER 35 U.S.C. § 102

Claims 16, 18, 19 and 22-30 are rejected under 35 U.S.C. § 102(b) as being anticipated by Summe, et al. (U.S. Pat. No. 5,366,916, hereinafter Summe). Applicants respectfully traverse this rejection. Claim 16 has been amended to define the step of maintaining the bias voltage for a predetermined time at a predetermined level to maintain the semiconductor device in an off state and radiating ultraviolet rays to the basic structure of the final passivation film for a second predetermined time after the step of maintaining the bias voltage. Thus, these limitations do not recite intended method of use limitations, they define specific steps to be followed.

The present invention is related to manufacturing a LDMOS, particularly a LDMOS that has a high voltage withstand property, in which deterioration of current capability is prevented even if the device is continuously operated for a long time by a burn-in test or the like. Although the structure of the LDMOS itself is known, the Applicants believe the method recited is novel.

The present inventors have determined that the deterioration of current capability of the LDMOS is due to an accumulation of carriers on the Si substrate boundary face which is located just beneath LOCOS oxide films (28, 50) covered with Poly-Si gate electrodes (29, 53). This is caused due to the repetitive switching operation (on/off) in

the LDMOS, particularly in the high withstand voltage LDMOS (when impurity density is low in P-layer 23 in Figs. 1 and 7, in P-layer 42 in Fig. 8, and in P-layer 68 in Fig. 9). The cited references make no disclosure regarding the source of this deterioration.

As a countermeasure to this deterioration, in the present invention a bias voltage is applied to the LDMOS, the voltage is maintained to maintain the semiconductor in the off state and then ultra-violet ray radiation is performed. As a result, the repetitive on/off operation of the LDMOS does not cause a decrease in the current capability. (Please refer to Figs. 12A-12B and Figs. 13A-13B).

Generally speaking, accumulated electrons being released by ultra violet rays and data erasure of EPROM is well known. The Examiner has used this fact as ground of the rejection. However, as described in the specification, simply radiating the ultra violet ray causes a wider dispersion of thresholds if the repetitive on/off operation is performed after the radiation (please refer to Fig. 11A) and the current drive capability decreases (please refer to Fig. 11B). Therefore, the present invention is not conceived by a combination of the two cited references.

In conclusion, in the two cited references, neither the deterioration of the current capability caused by the repetitive on/off operation for a long duration of time nor the method to improve this phenomena by applying the bias voltage, maintaining the LDMOS off state and then radiating of the ultra violet rays is disclosed.

Thus, Applicants believe Claim 16, as amended, patentably distinguishes over the art of record. Likewise, Claims 18, 19 and 22-30, which ultimately depend on Claim 16, are also believed to patentably distinguish over the art of record. Reconsideration of the rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 31 and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Summe (U.S. Pat. No. 5,366,916) in view of Yamaguchi, et al. (U.S. Pat. No. 5,777,365, herein after Yamaguchi). Claim 33 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Summe (U.S. Pat. No. 5,366,916). Claims 31-33 ultimately depend from Claim 16. As stated above, Claim 16 has been amended and is now believed to patentably distinguish over the art of record. Thus, Claims 31-33 are also believed to patentably distinguish over the art of record. Reconsideration of the rejection is respectfully requested.

REJOINDER OF CLAIMS

Applicants have amended independent Claim 17 to depend from Claim 16. Thus, Claim 16 is now believed to be generic to withdrawn Claims 17, 20, 21 and 34-45. Thus, Applicants respectfully request the rejoinder of withdrawn Claims 17, 20, 21 and 34-45.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt

and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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